

# Microbead Platform Assay Process

STEP 3

Code and

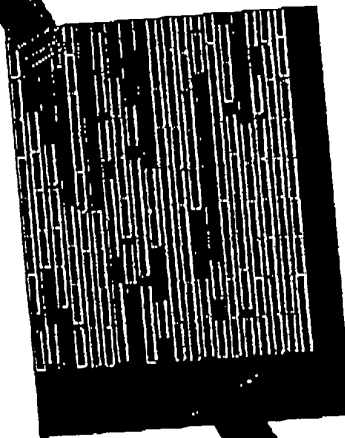
Fluorescence

Read-out in Solution



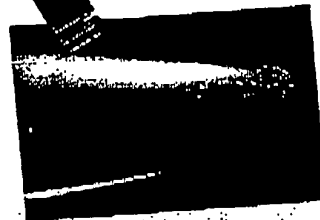
STEP 2

Beads self-assemble  
in groove plate



STEP 1

Beads  
Hybridized  
in Solution



Data management  
& bioinformatics

STEP 4

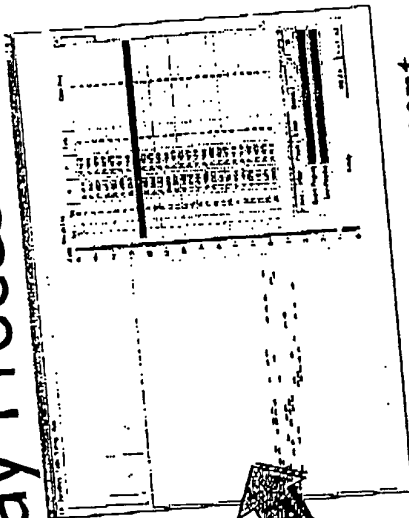


Fig. 1

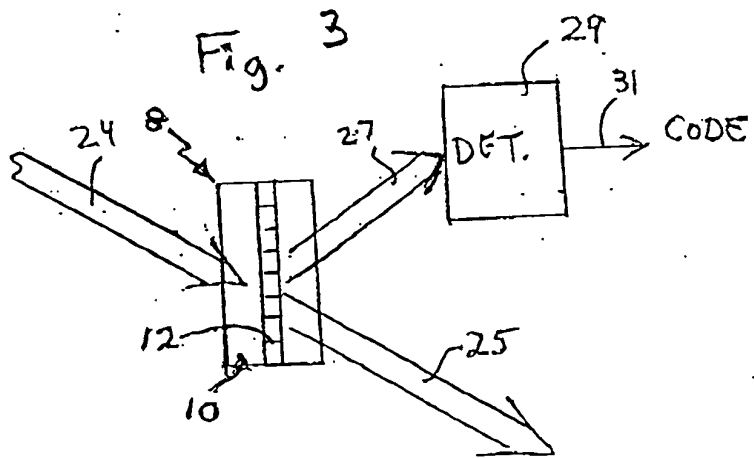
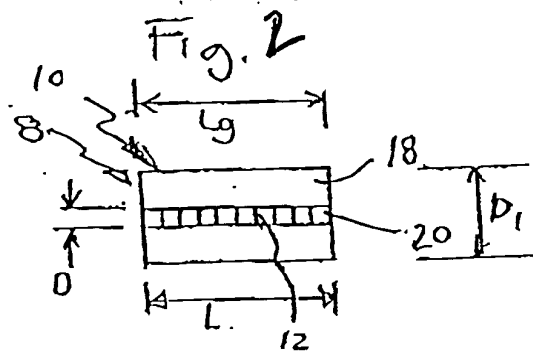
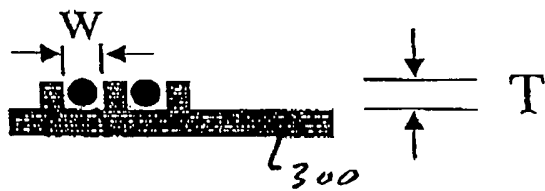
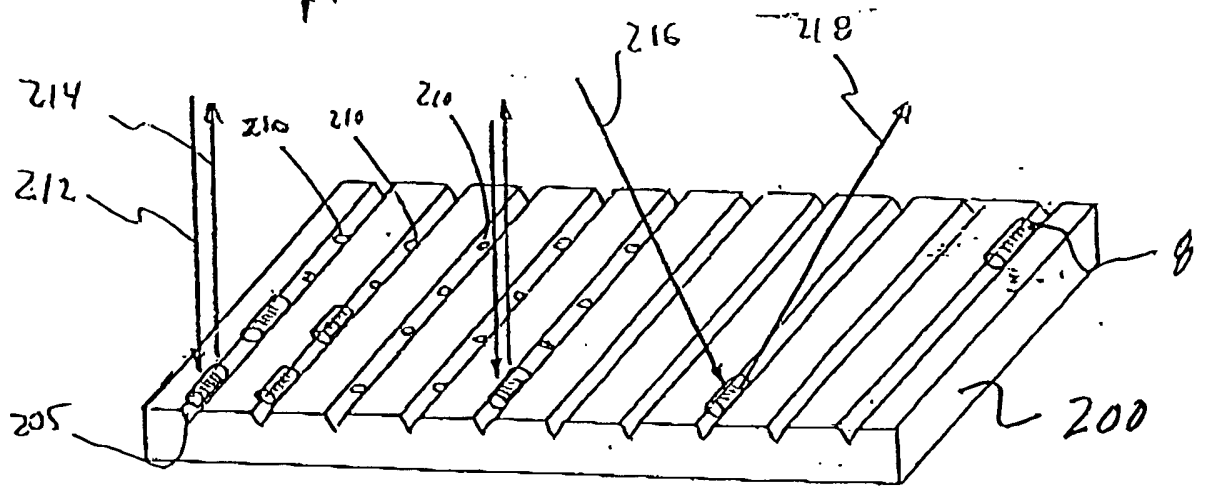


Fig. 4



$$0.5D < T < 1.5D$$

$$0.8D < T < 1.2D$$

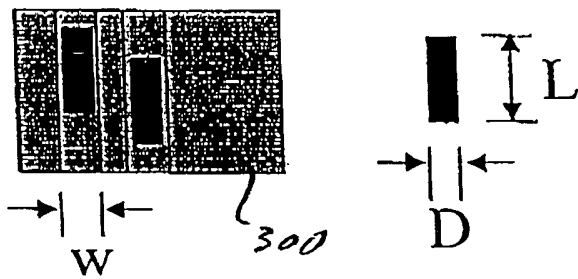
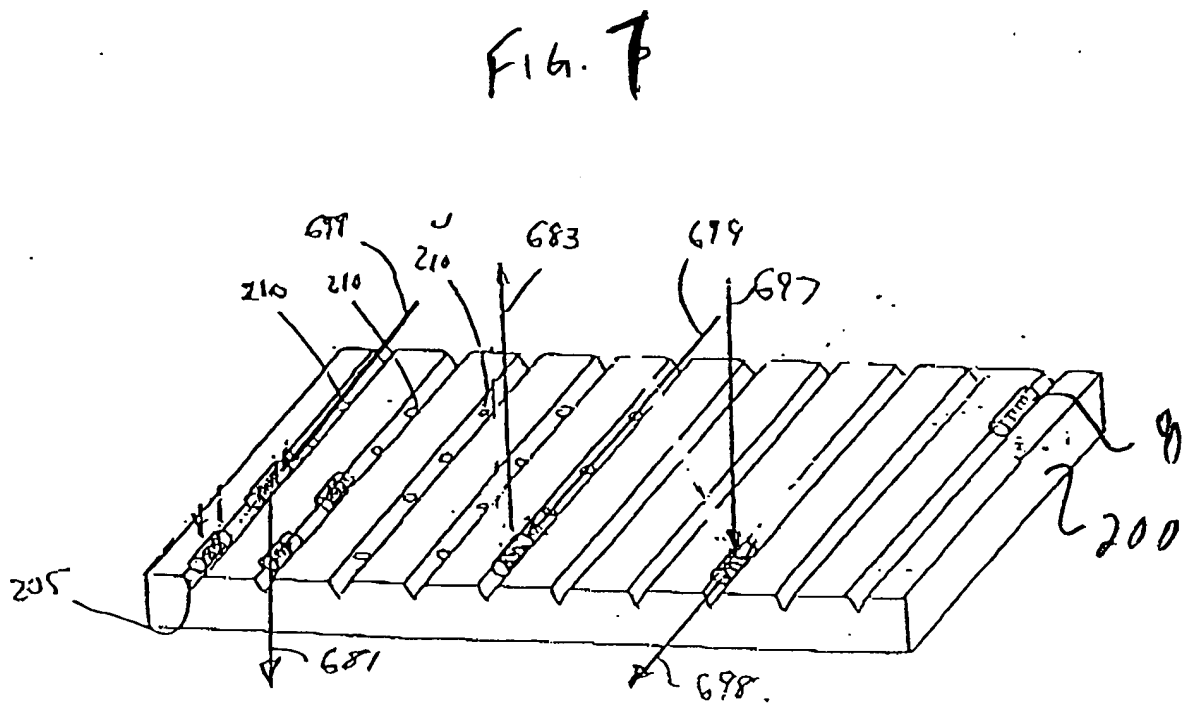
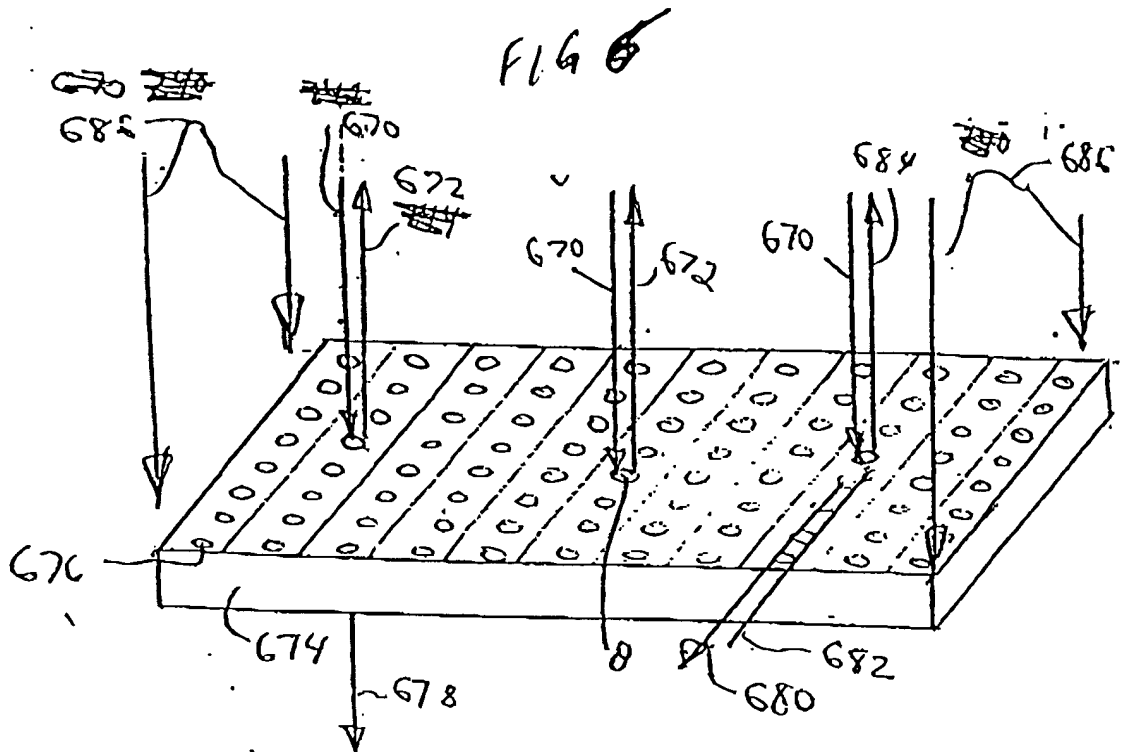


Fig 5



# Microbead Mapper Readings

- ① - Code = 41101
- ② - Code = 20502
- ③ - Code = 41125

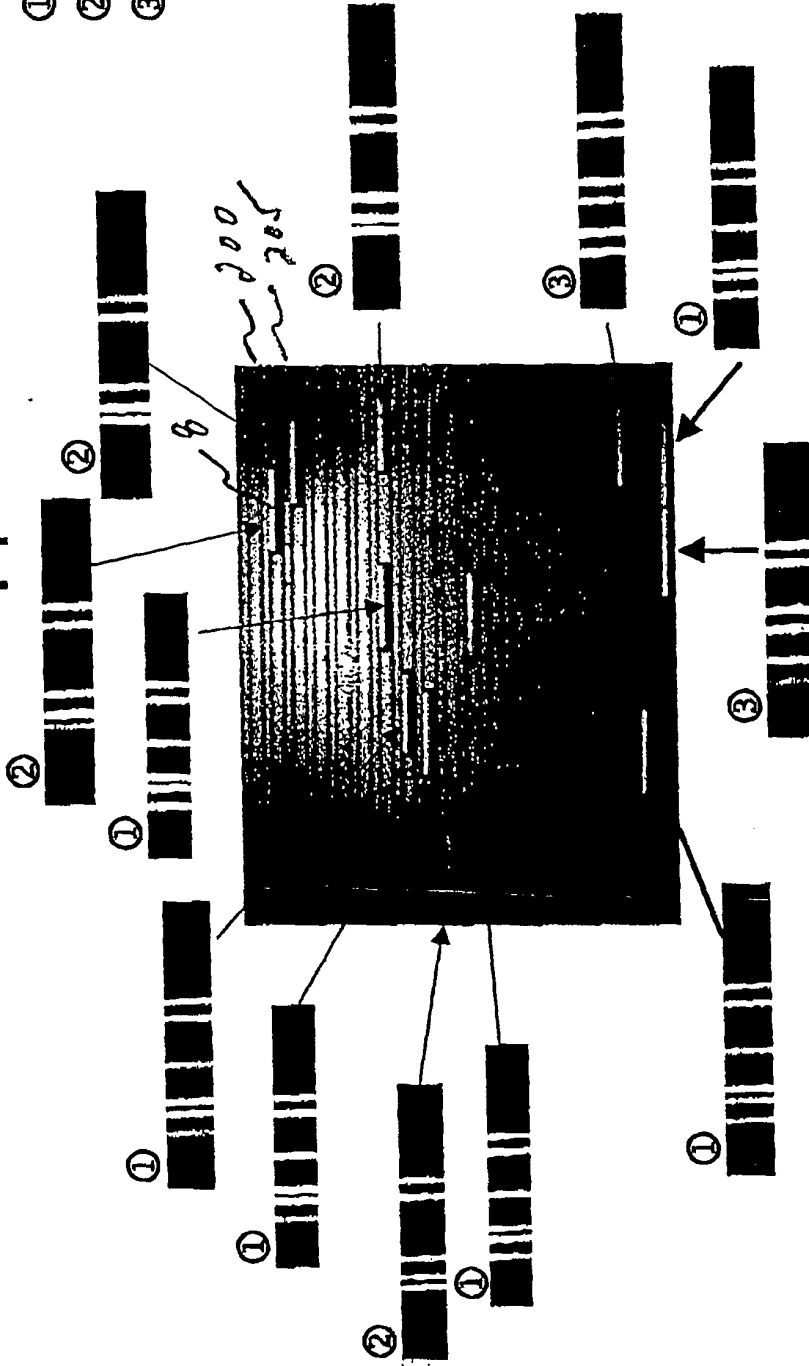


Fig. 8

- Three different codes in this set (16 bit, binary symbology)
- Each code different oligo attached

can have a



ca 05

8b { Open Plate Format / 8d

~ 200

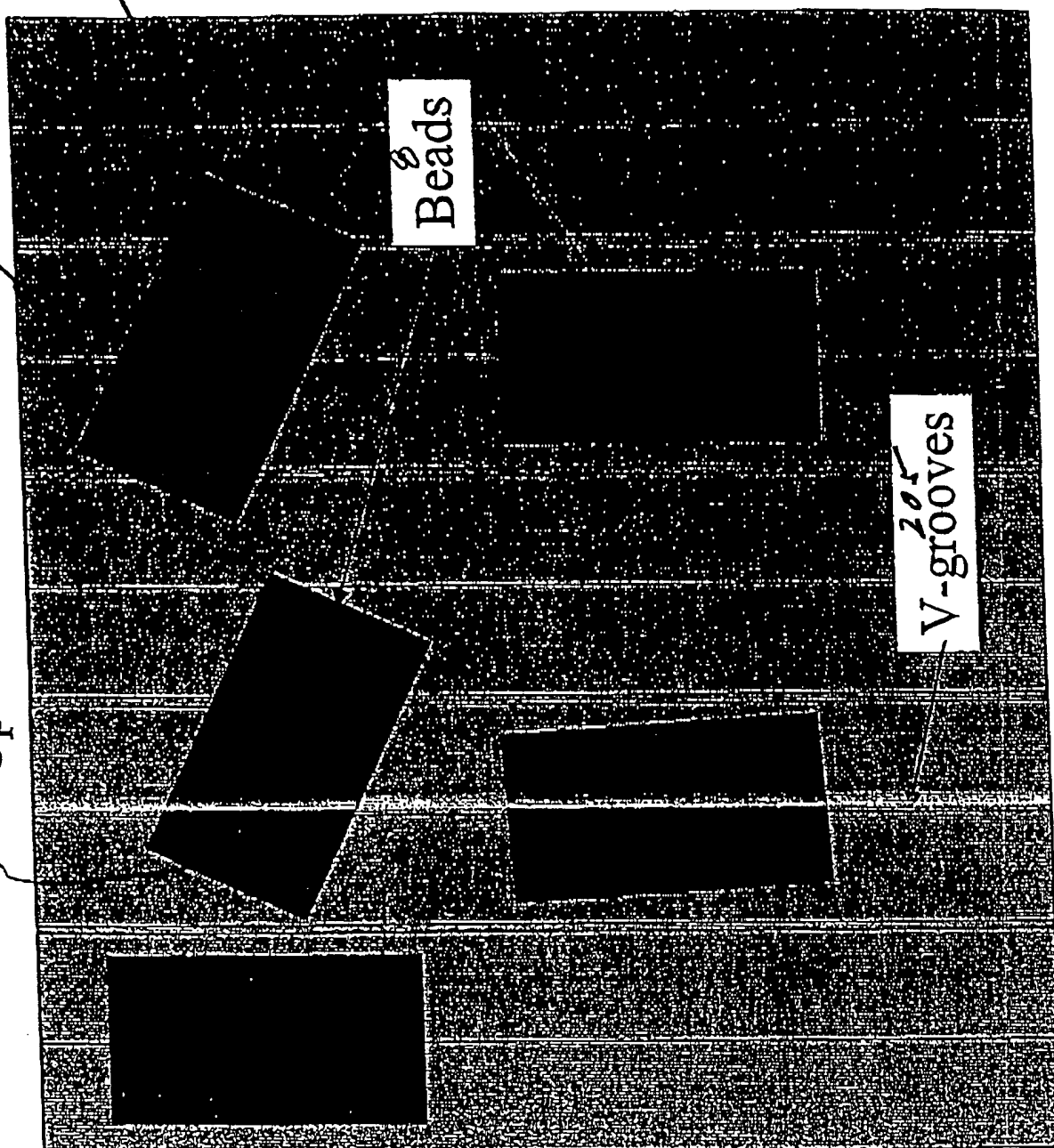


Fig. 89

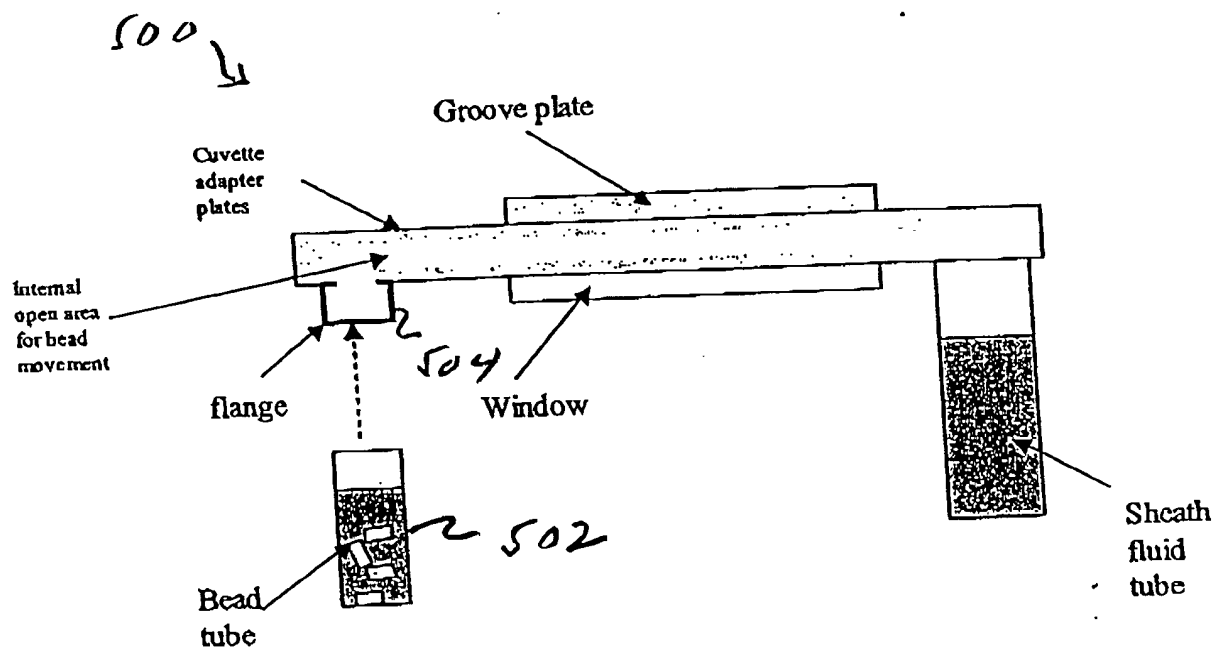


Figure 1 Starting point for handling microbeads for readout



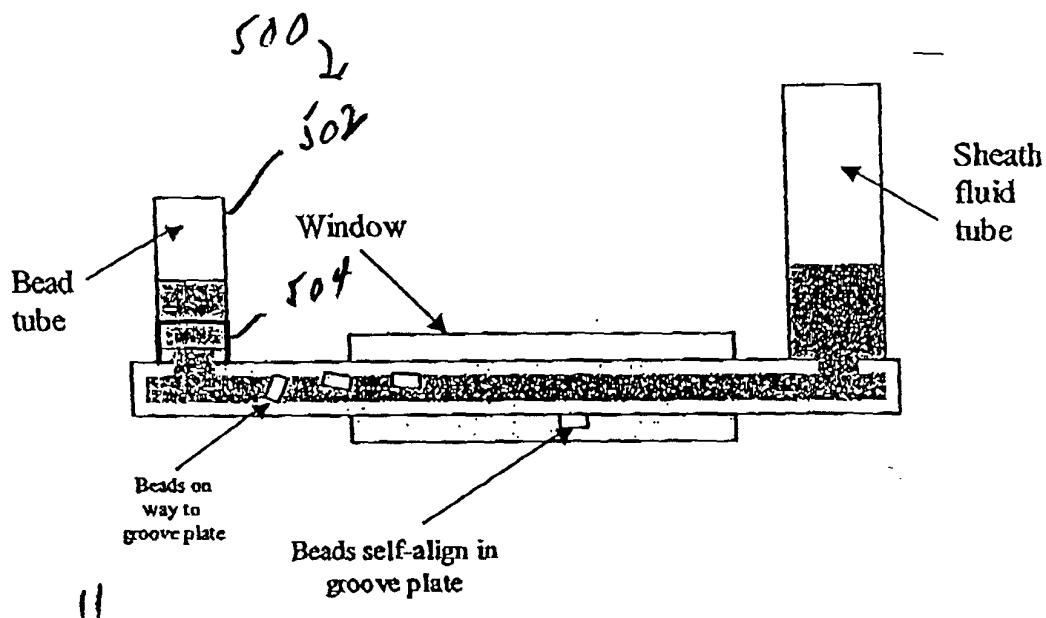


Figure 11 Second step in readout process. The cuvette is inverted and the beads flow onto the groove plate. The beads will naturally self-align in the groove plate with a small amount of rocking or agitation.

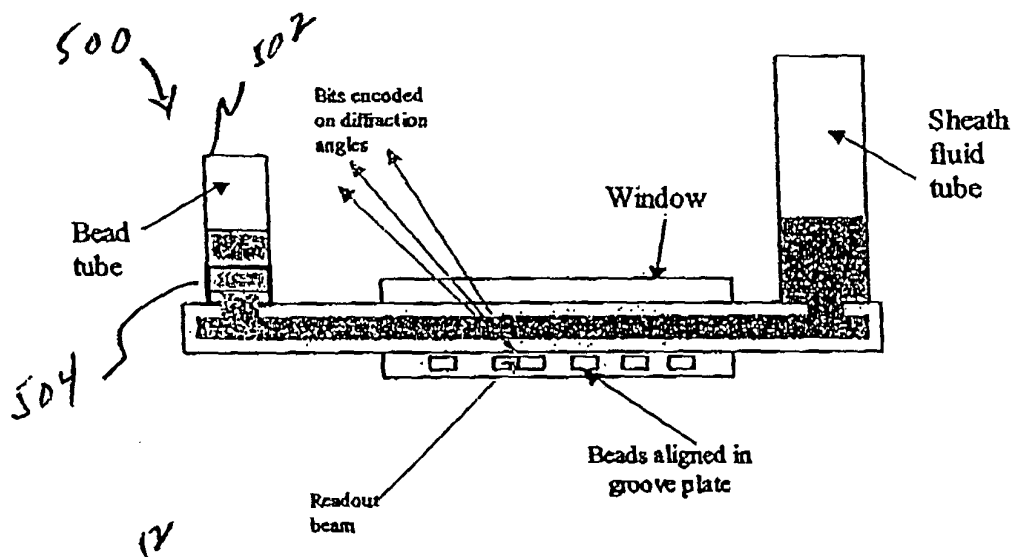
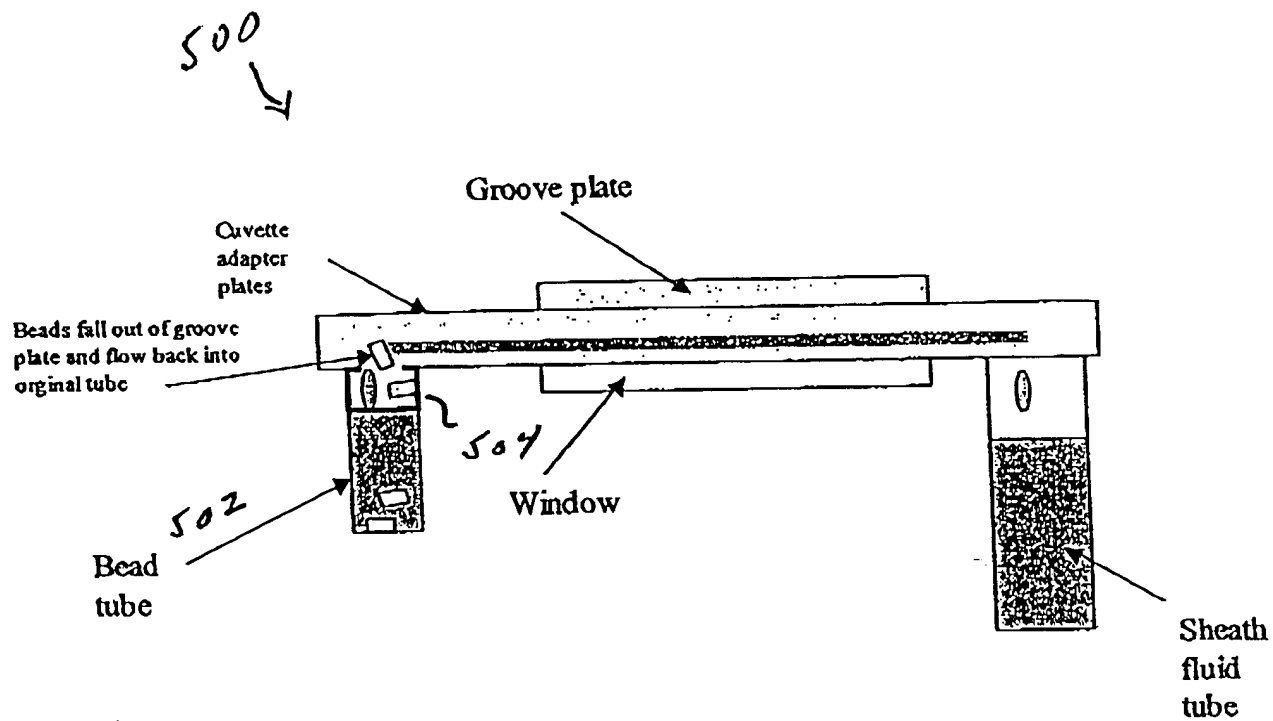
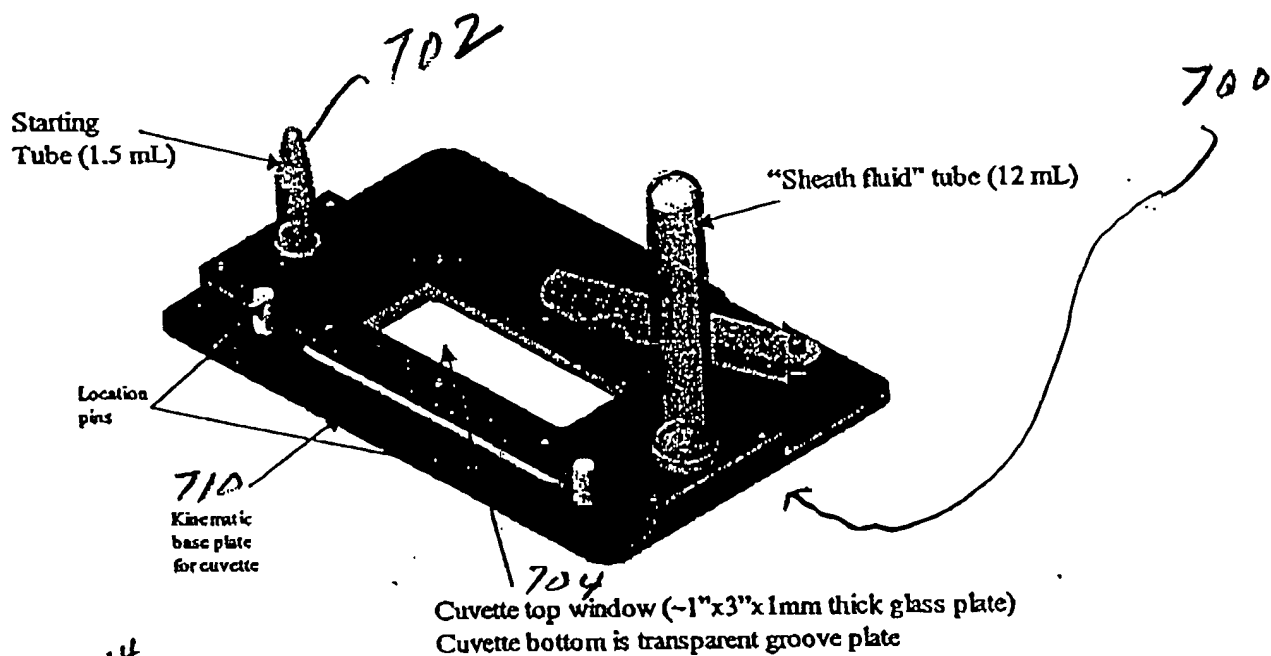


Figure 12 Readout step. The beads are all (or nearly all) aligned in the groove plate. The entire plate is moved (or the readout laser beam is scanned) in order to read the codes of each bead.



13  
**Figure 13** Final step. The cuvette is inverted to its original position and the beads flow back into the original tube.



14  
**Figure 14** Example of cuvette showing its mount on a kinematic base plate.

009022

Design 2  
Port for  
fluid fill/empty  
Air port

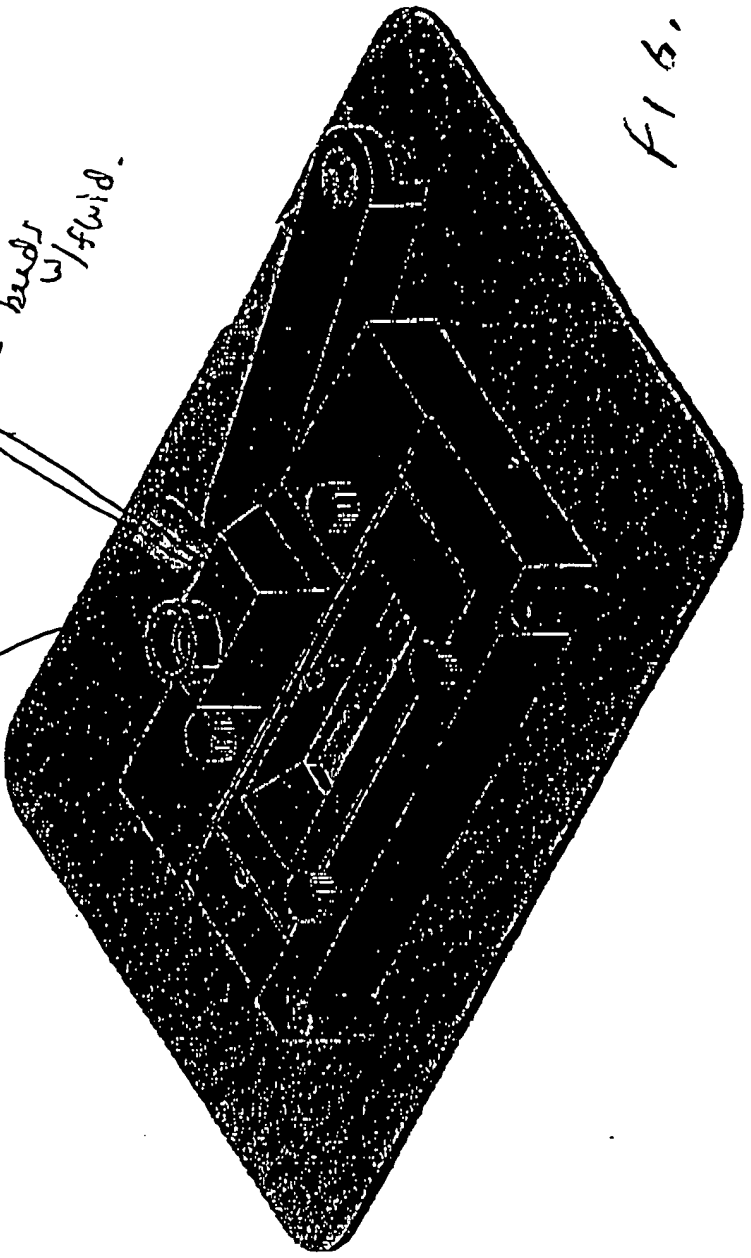
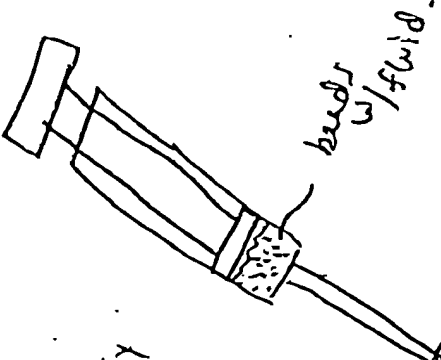


Fig. 15

069022

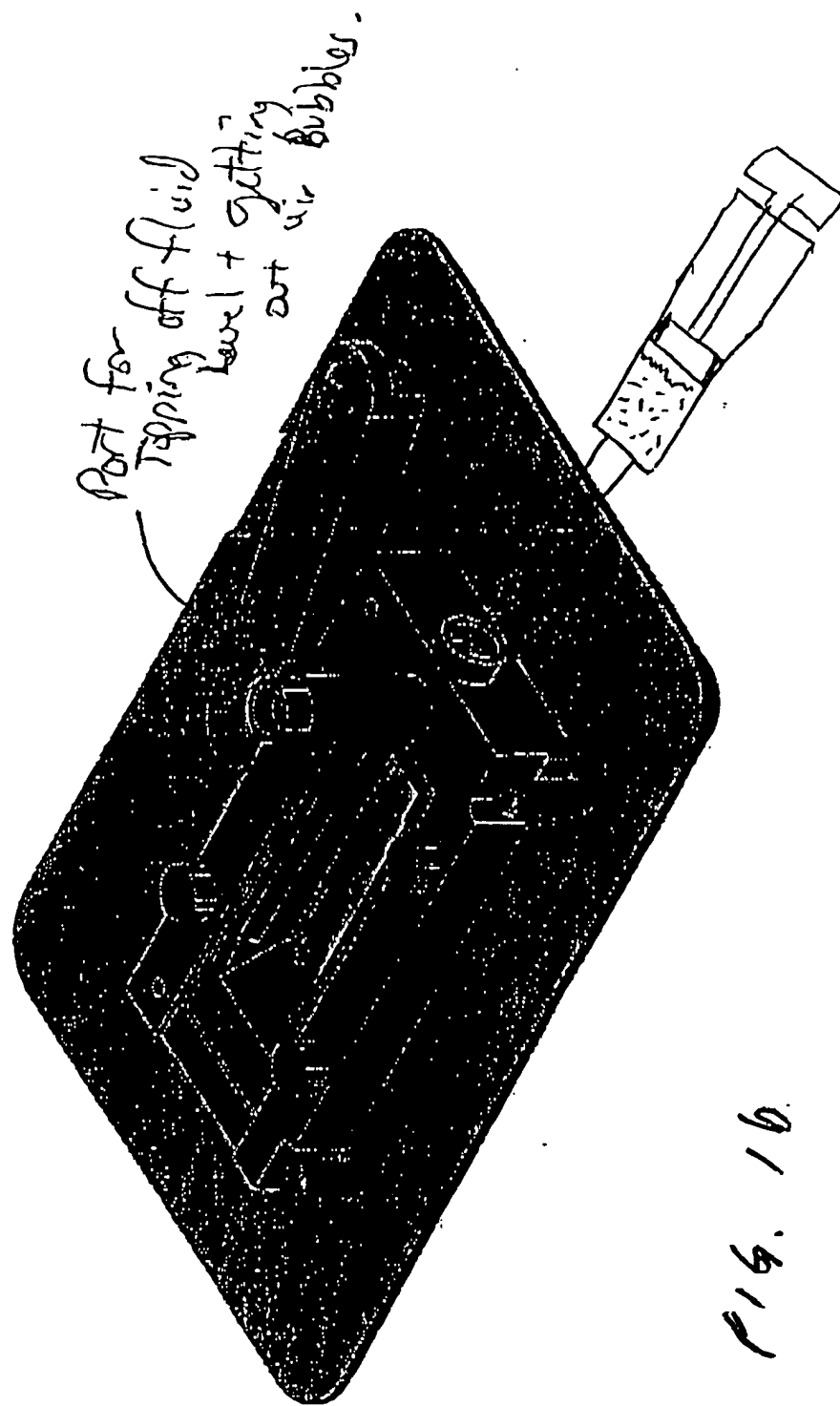
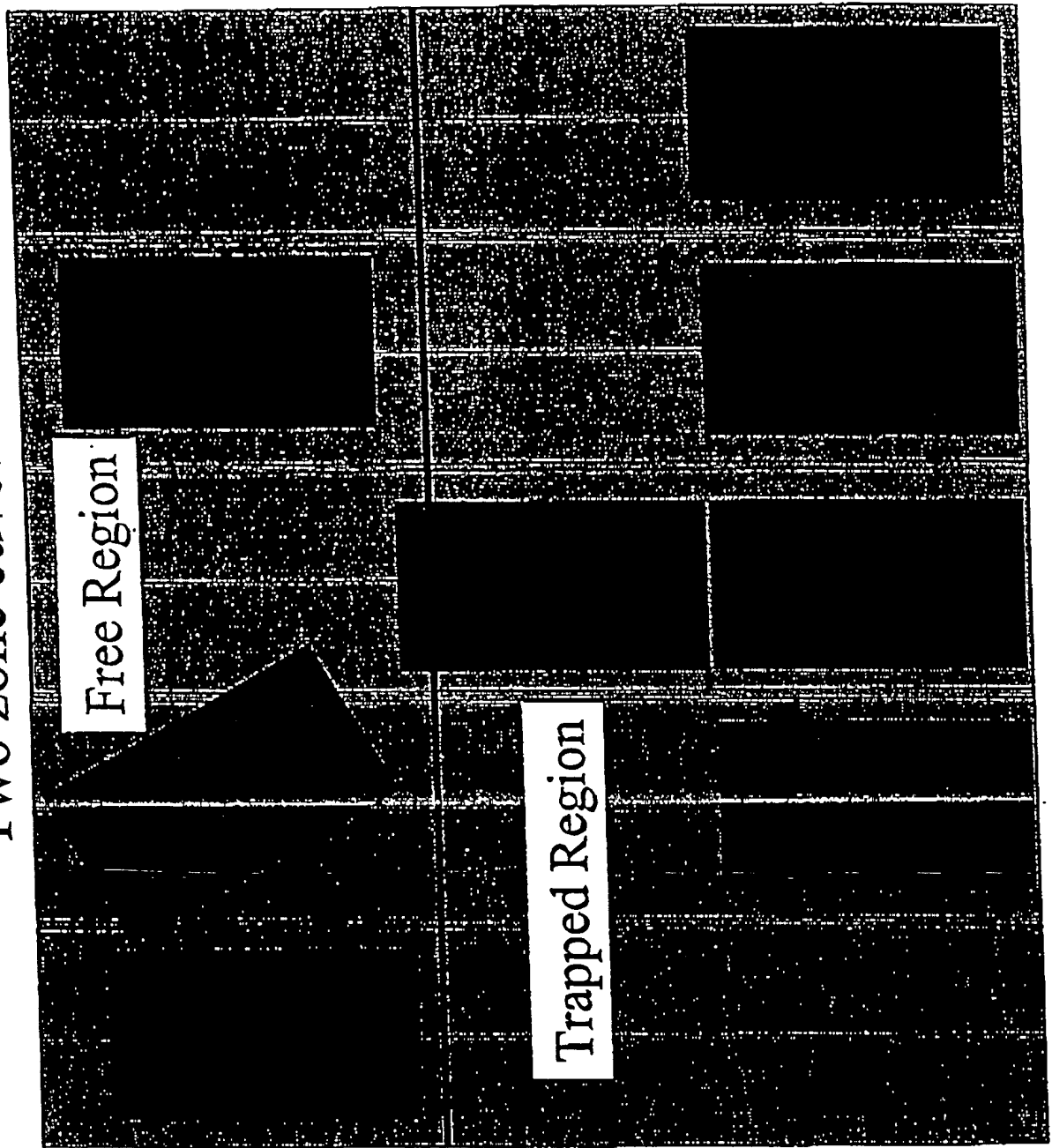


Fig. 16

Two zone cuvette



G →

Fig. 17

020572

CR 0569

# Cytometer Method

Conventional Flow cytometer Reader (single pass)      Disk Cytometer reader (multi pass)

1000

900

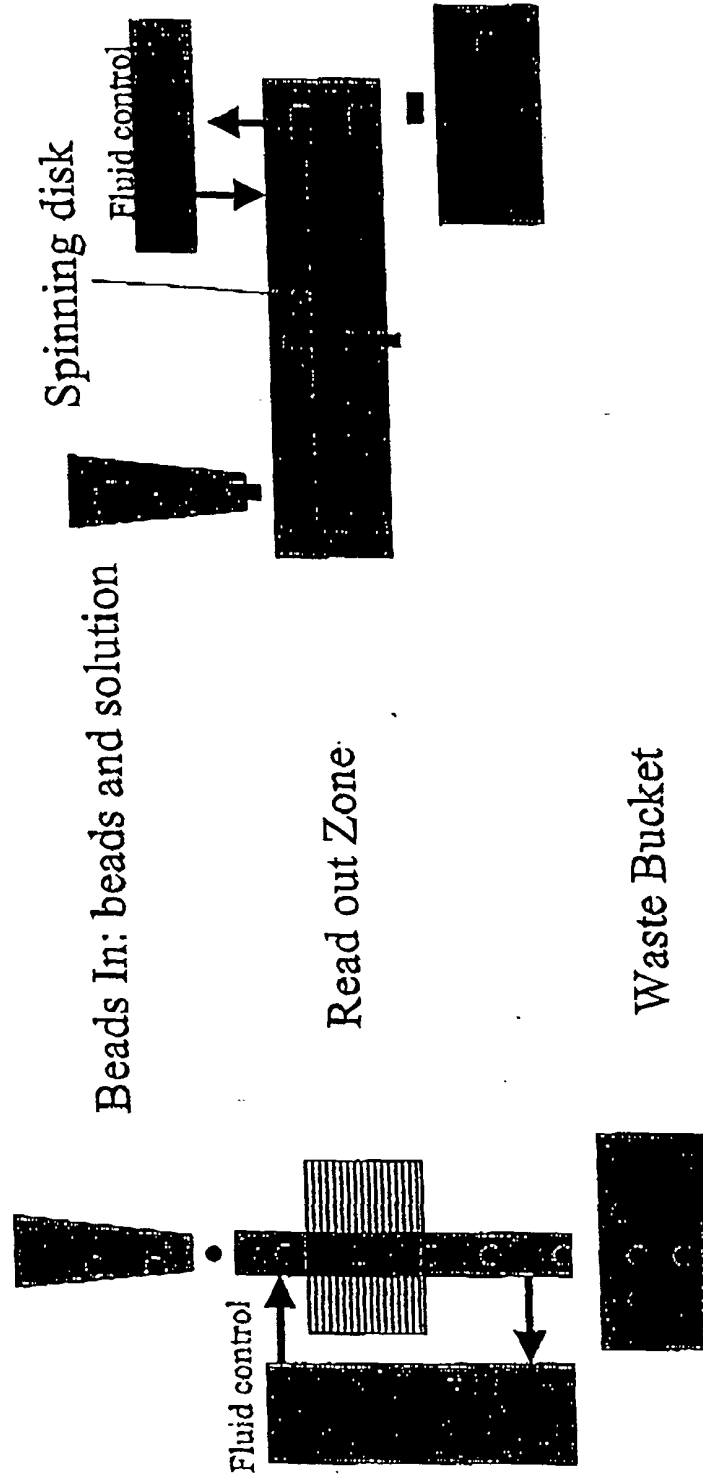


Fig. 18: (b)

(a)

Fig. 19  
Disk Cytometer

585022

grooves can be oriented in any desired direction

Plasma groove plates positioned in disk platform rotating

"Cytometer-like" bead reader

Bead Loading Zone 1256

12048

12048

12048

12048

12048

12048

12048

12048

12048

12048

12048

12048

12048

12048

12048

12048

12048

12048

12048

12048

12048

12048

12048

12048

Bead Removal Zone 1258

1254

1254

1254

1254

1254

1254

1254

1254

1254

1254

1254

1254

1254

1254

1254

1254

1254

1254

1254

1254

1254

1254

1254

Radial Groove 1280

1282

1282

1282

1282

1282

1282

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1282

1282

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1282

1282

1282

1282

1282

1286

head loading area

1286

1286

1286

1286

1286

1286

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1286

1286

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1286

1286

1286

1286

1286

1284a

1284b

1284c

1284d

1284e

1284f

1284g

1284h

1284i

1284j

1284k

1284l

1284m

1284n

1288

Wedge

Shape

Spacer

keeps channel

at a constant

gap width.

1288

1288

1288

1288

1288

1288

1288

Wall

1290

Tight

Read

Packing

due to

Rotational

forces

1290

1290

1290

1290

1290

1290

Read out Zone

1260

Read out Zone

1260

Read out Zone

1260

Read out Zone

1260

Read out Zone

1260

Read out Zone

1260

Read out Zone

1260

Window in contact with fluid

1262

Window in contact with fluid

1262

Window in contact with fluid

1262

Window in contact with fluid

1262

Window in contact with fluid

1262

Window in contact with fluid

1262

Window in contact with fluid

1262

Circumferential; concentric grooves

1262

Circumferential; concentric grooves

1262

Circumferential; concentric grooves

1262

Circumferential; concentric grooves

1262

Circumferential; concentric grooves

1262

Circumferential; concentric grooves

1262

Circumferential; concentric grooves

1262

1204d

1204e

1204f

1204g

1204h

1204i

1204j

1204k

1204l

1204m

1204n

1204o

1204p

1204q

1202

1202

1202

1202

1202

1202

1202

1202

1202

1202

1202

1202

1202

1202

1204b

1204c

1204d

1204e

1204f

1204g

1204h

1204i

1204j

1204k

1204l

1204m

1204n

1204o

1200

1200

1200

1200

1200

1200

1200

1200

1200

1200

1200

1200

1200

1200

(c)

(v)

(b)

6850 W

MECHANICAL  
IRIS - PROVIDES  
VARIABLE APERTURE  
FOR BEAD ACCESS  
TO GROOVES 1402

# Disk groove plate with radial channels for spin drying

1300  
CATCHER  
CAN MOVE  
RADIALLY  
OUTWARDLY  
IF DESIRED

1300  
- BEAD CATCHER  
FOR REGULATION  
LOOSE BEADS  
CAN BE  
MOVABLE

"Cytometer-like" bead reader.

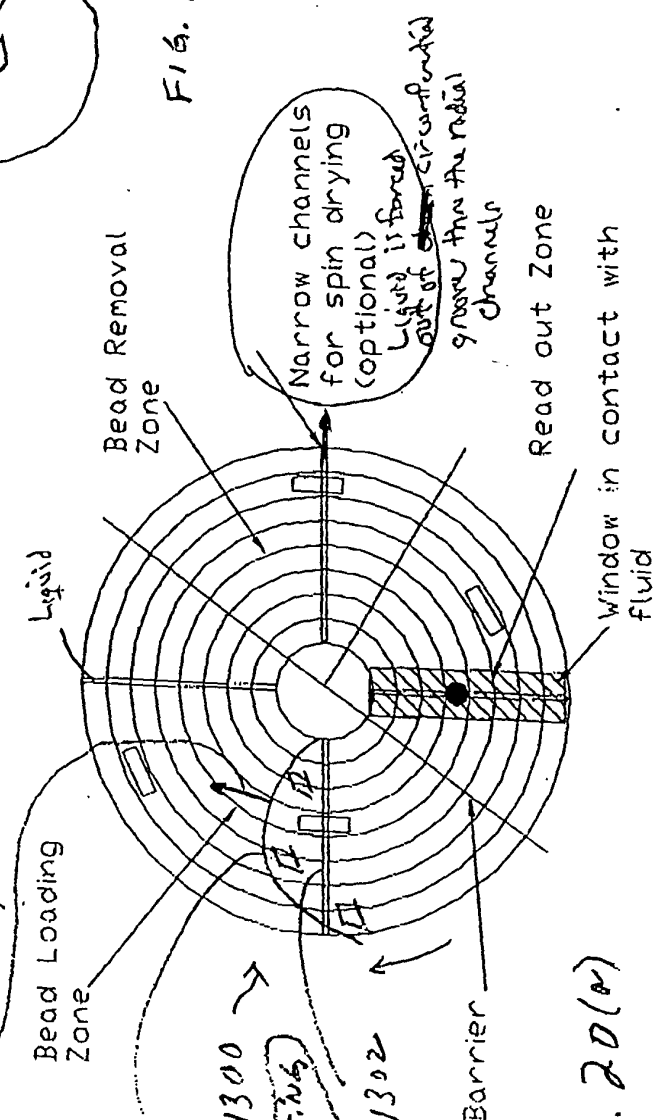


FIG. 20(b)

FIG. 20(a)



509

450 x 65 um beads on SU8 groove plate

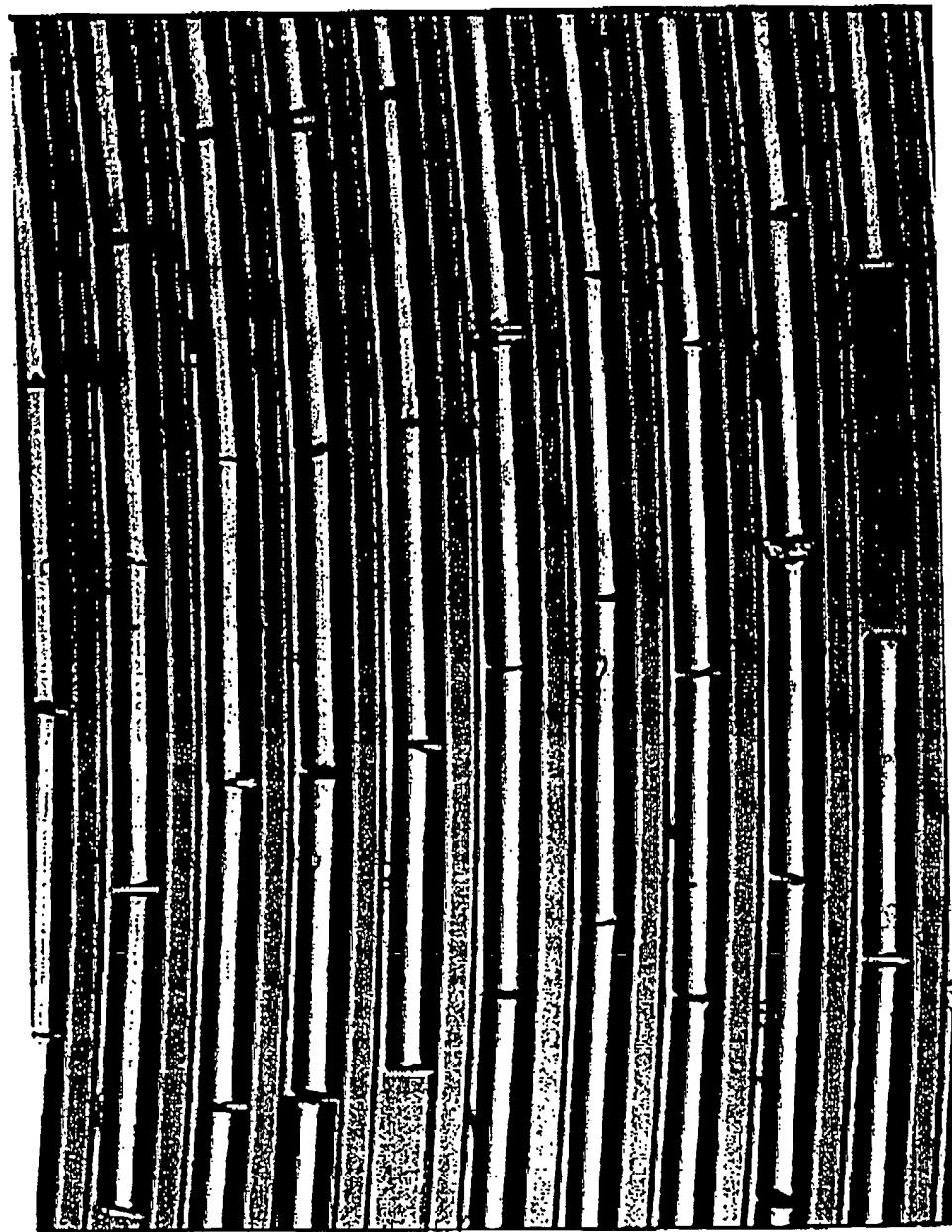
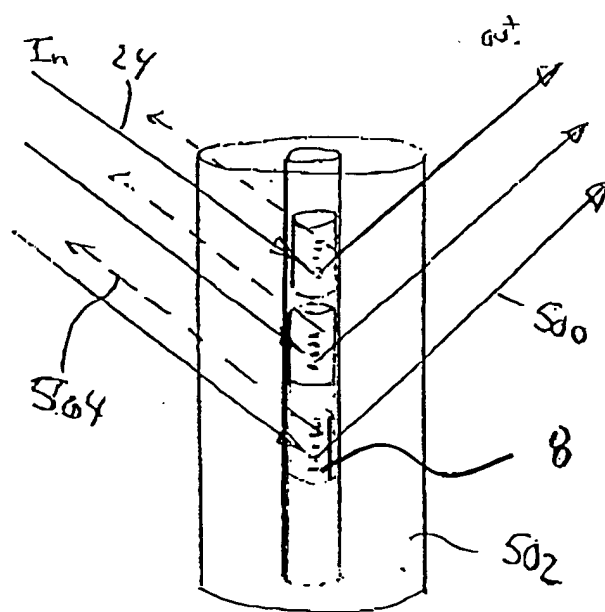


Fig. 21

Fig. 22



→ Alternative to planar/plate alignment forms  
 the beads may be aligned in a tube, fluid may  
 flow thru the tube to move beads along tube.  
 "Flow Cytometer"

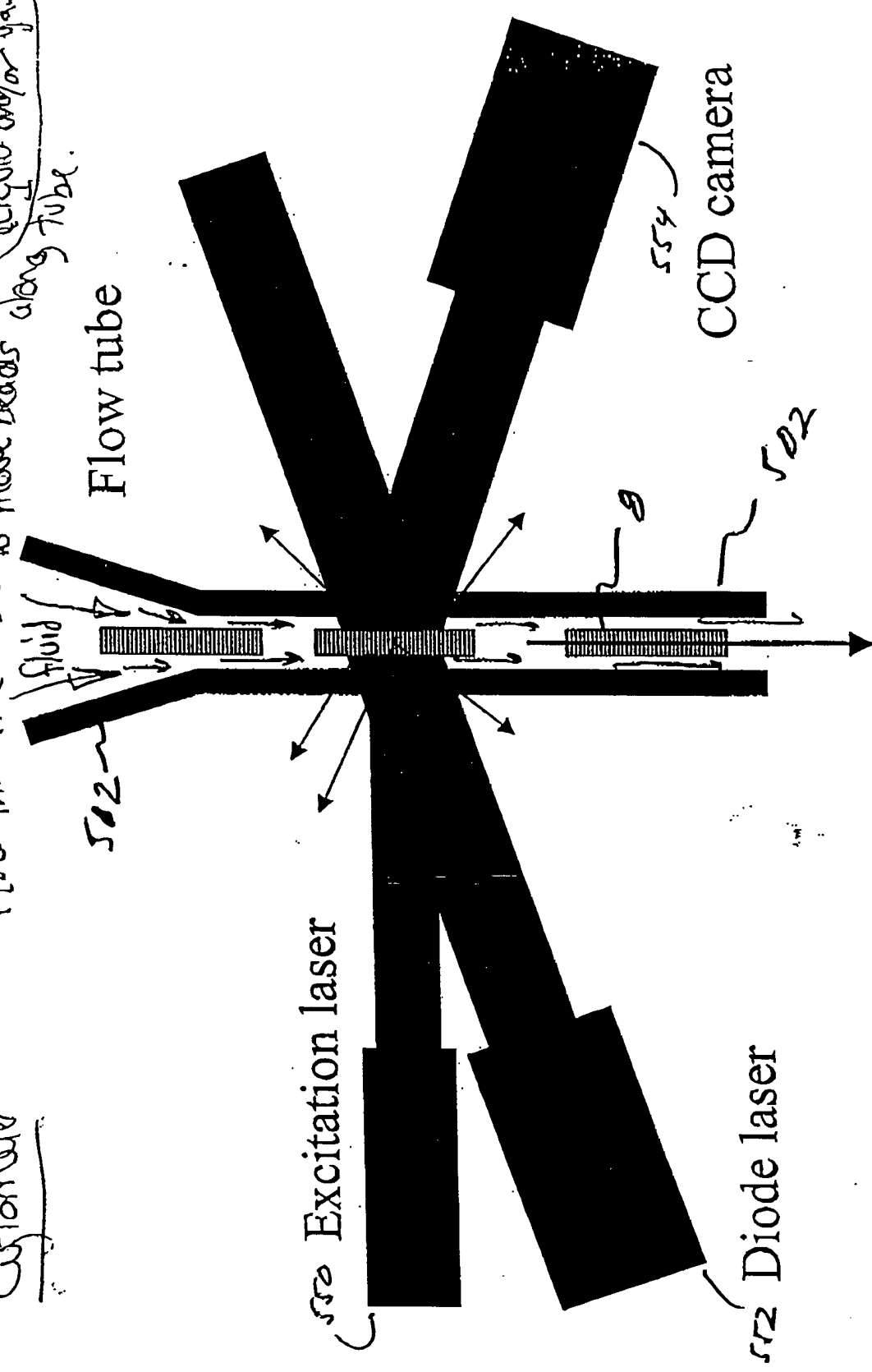


FIG. 23

FIG. 24

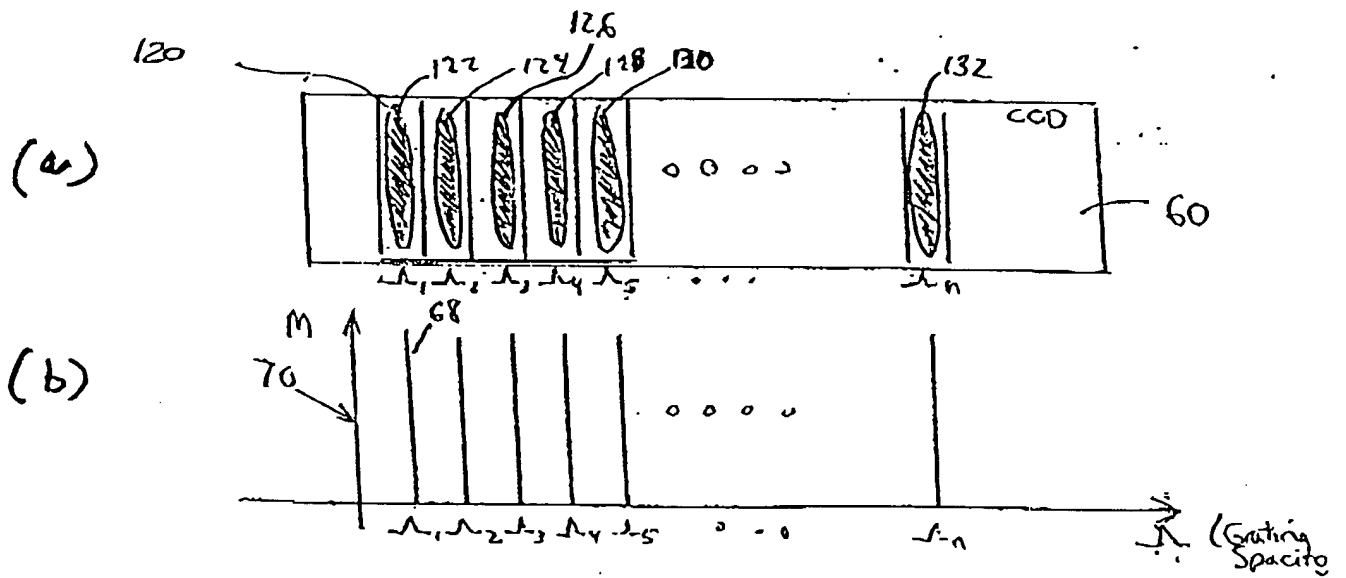
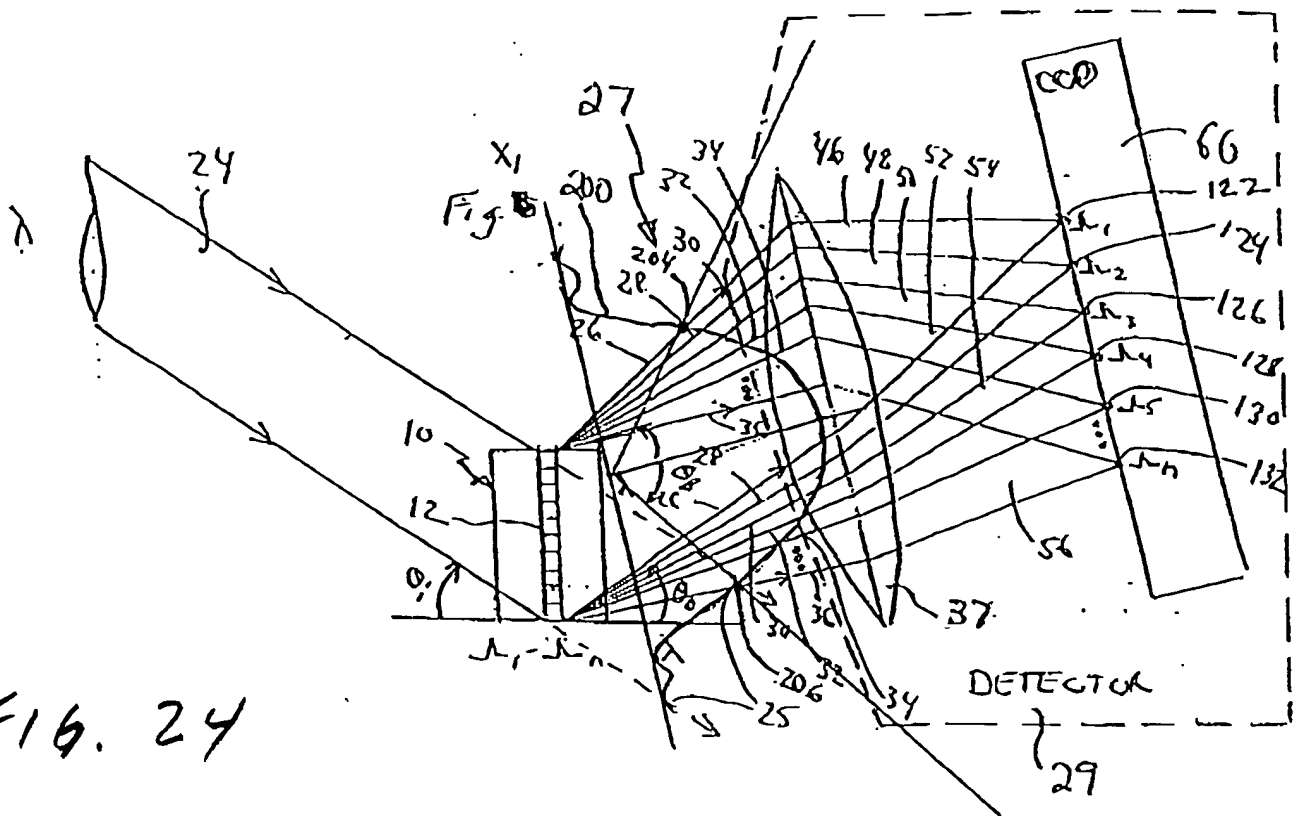
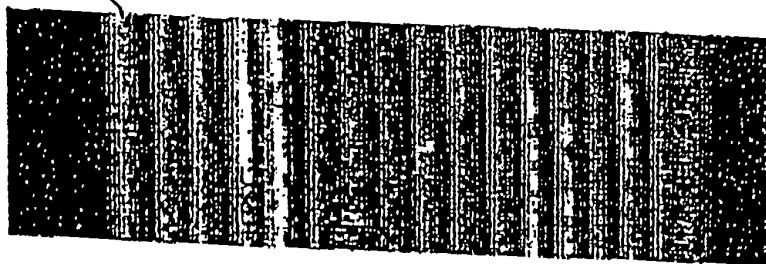


Fig. 26

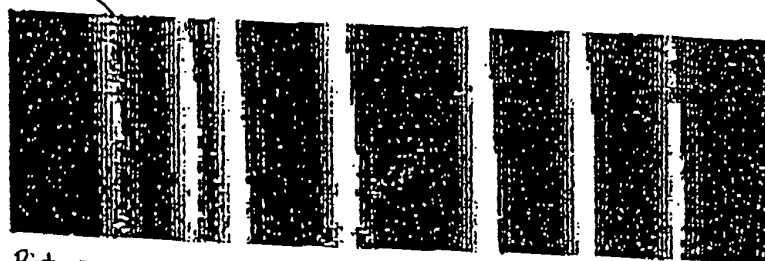
CC-~~6642~~

89 17 bits turned on



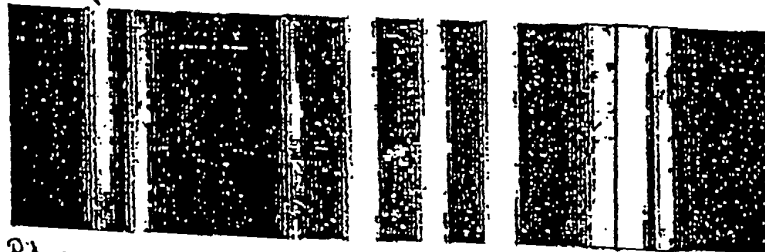
Bits: 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  
(a)

89 7 bits turned on



Bits: 1 0 1 1 0 0 1 0 0 0 1 0 0 1 0 0 1  
(b)

89 9 bits turned on



Bits: 1 1 0 0 0 1 0 1 0 1 0 1 0 0 1 1 1  
(c)

FIG. 27

CC-~~6448~~

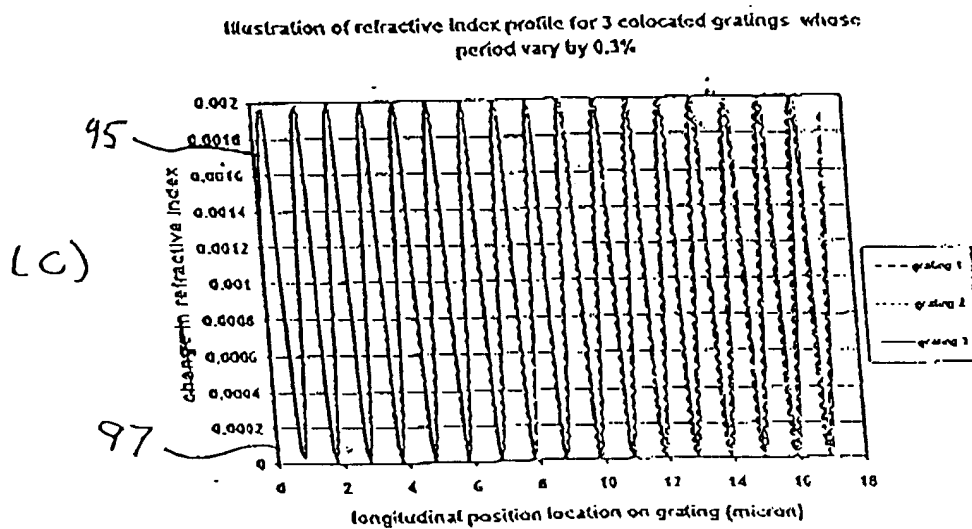
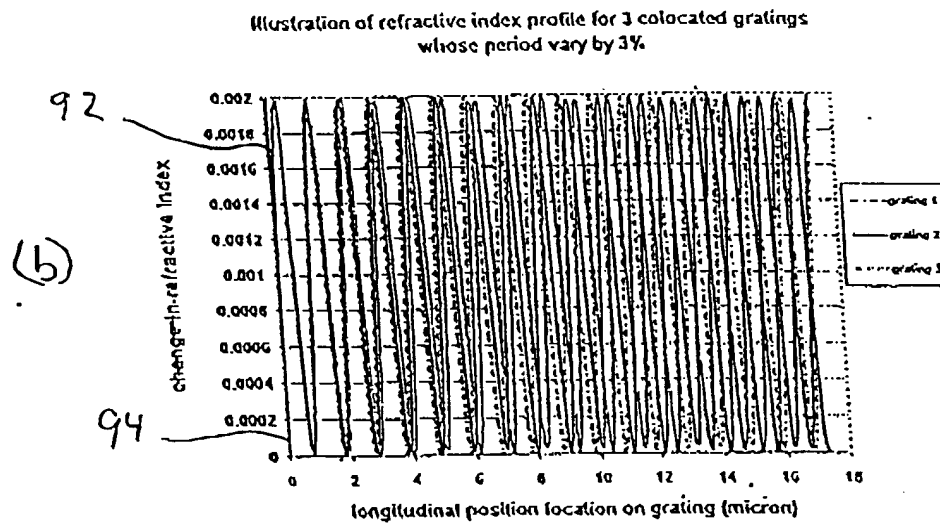
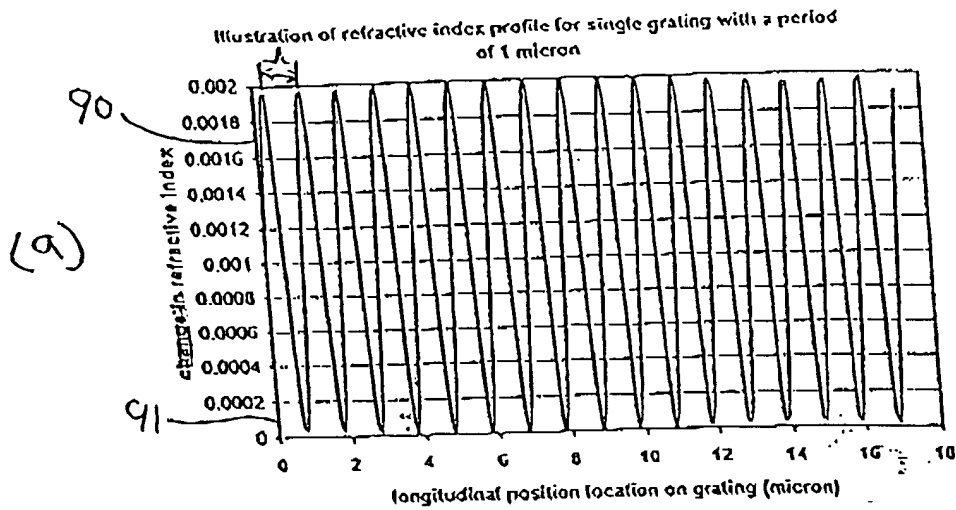


FIG 27

CC-0048

(d)

Index modulation caused by superposition of 3 gratings where the pitch between each grating varies by 3%.

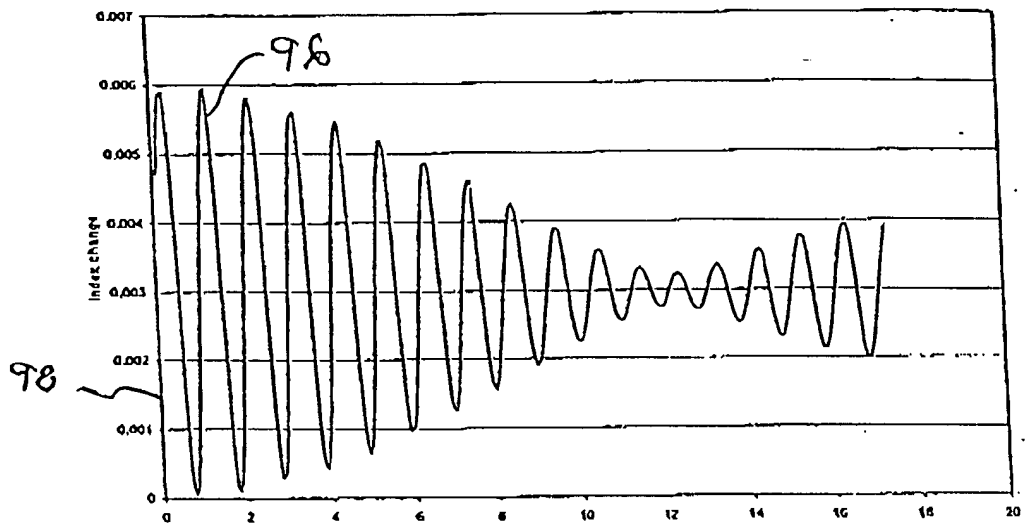


FIG. 28

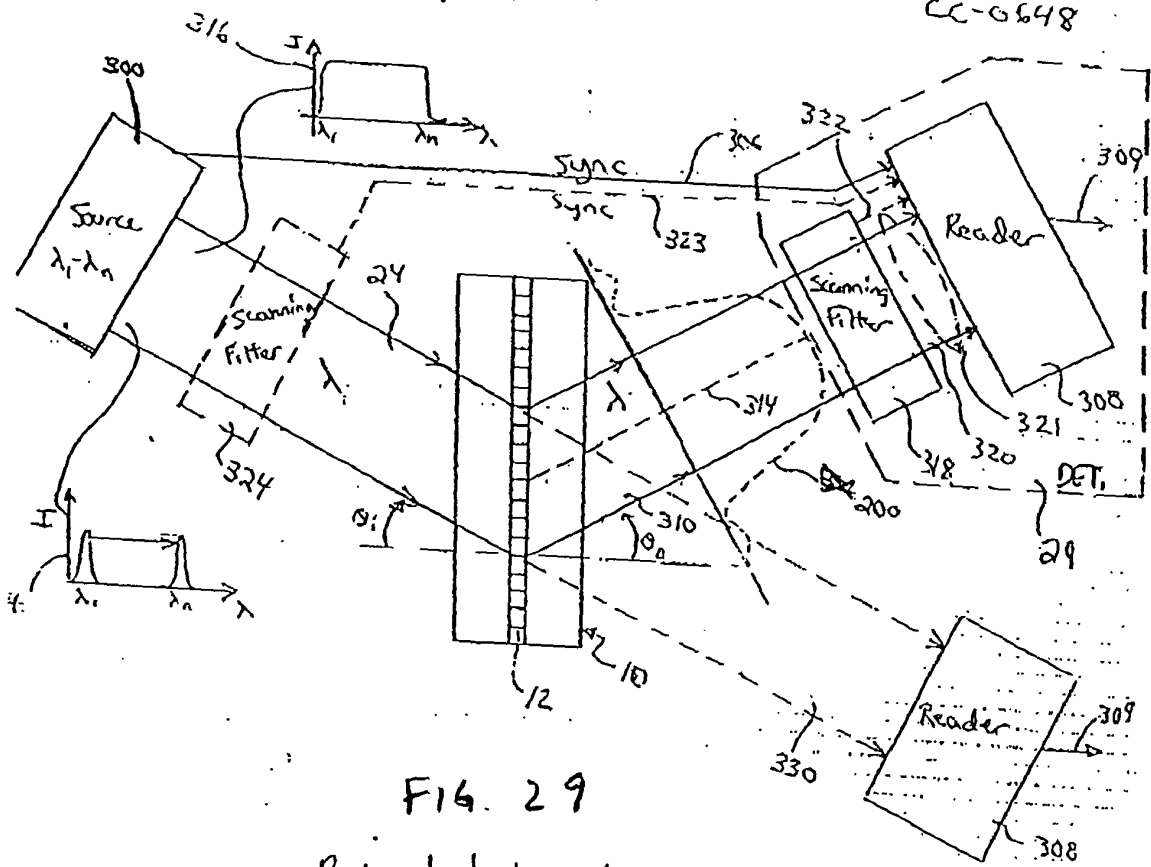
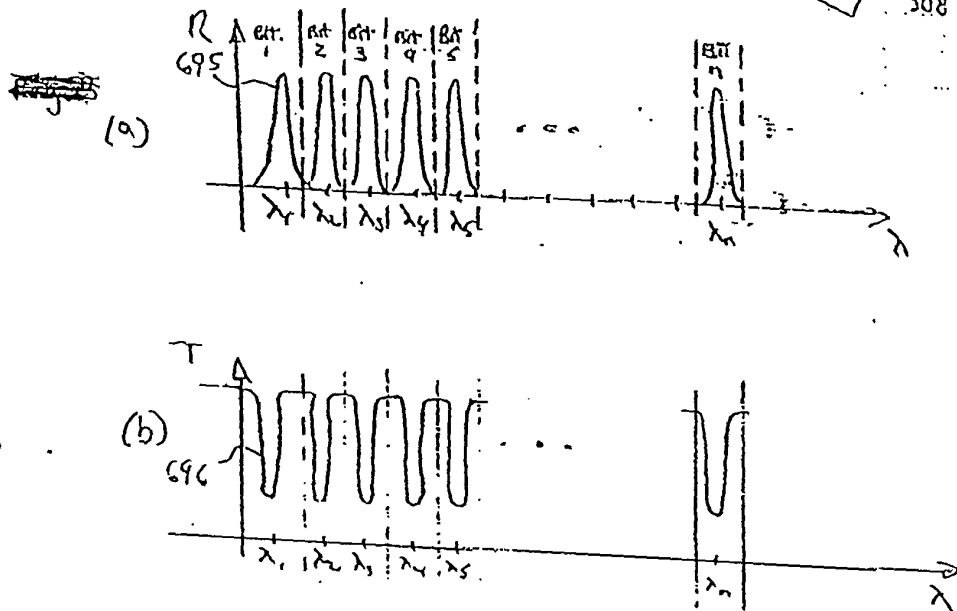


FIG. 29





CC-0648

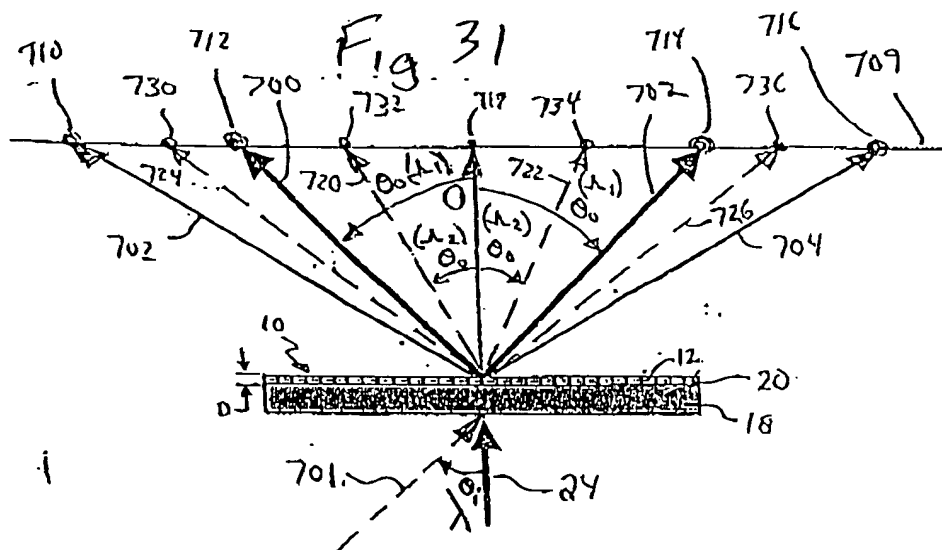


FIG. 32

CC-0648

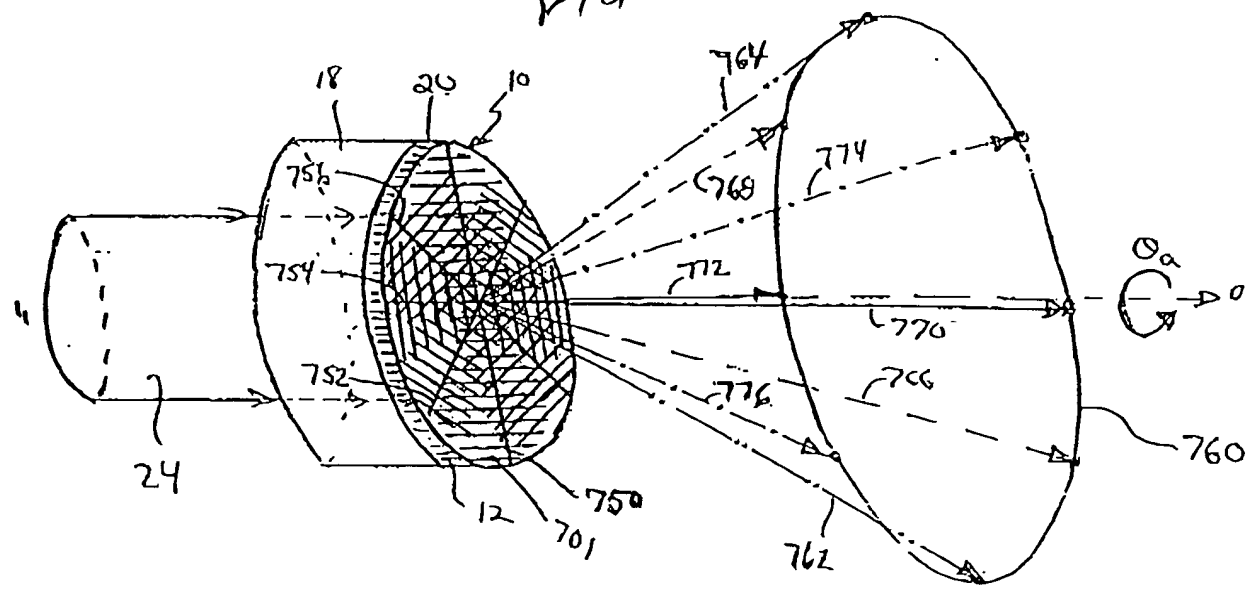


FIG. 33

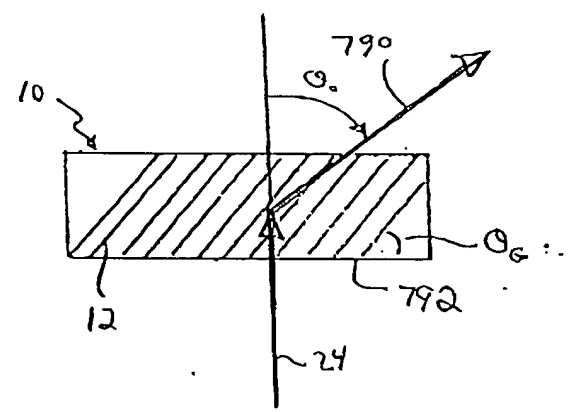


Fig. 34

CC-~~6578~~

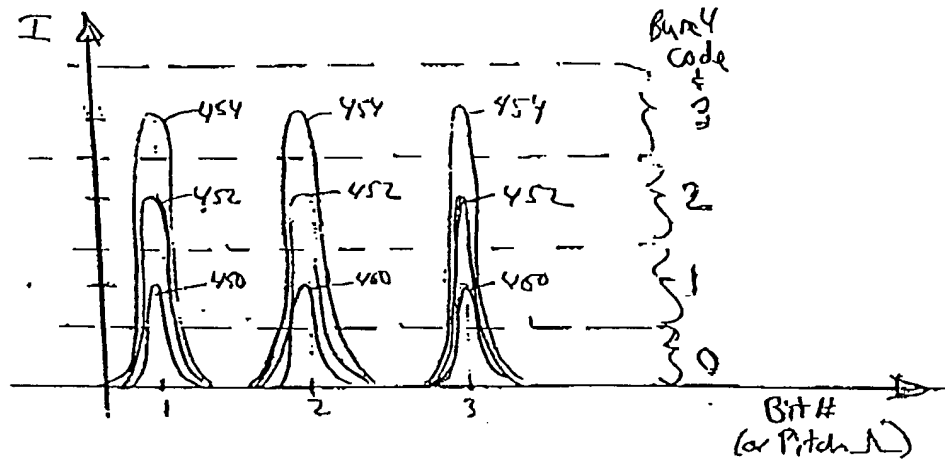


Fig. 35

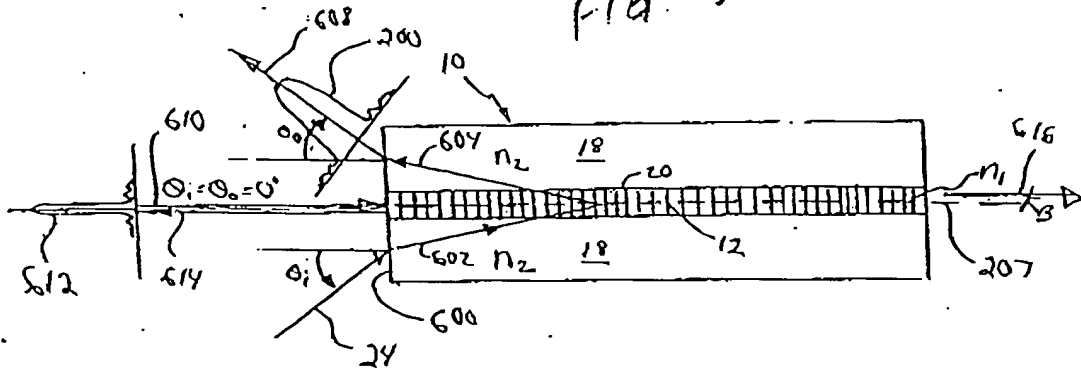


Fig. 38

CC-05510

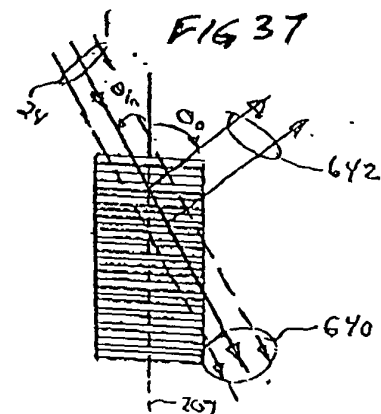
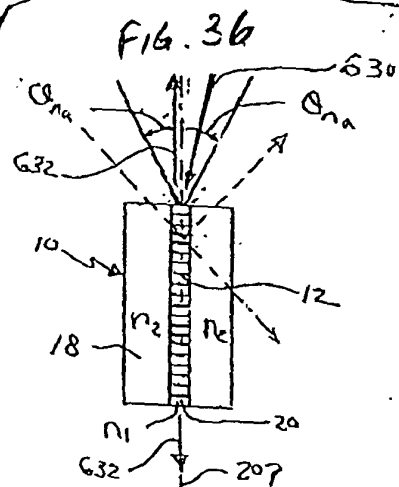
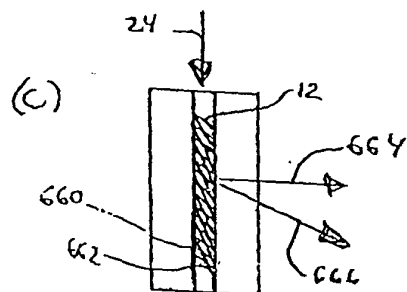
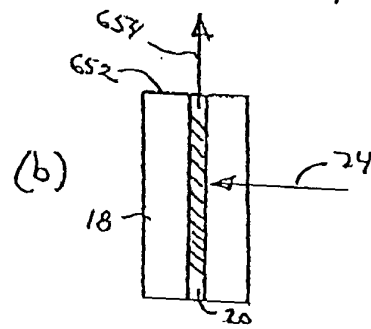
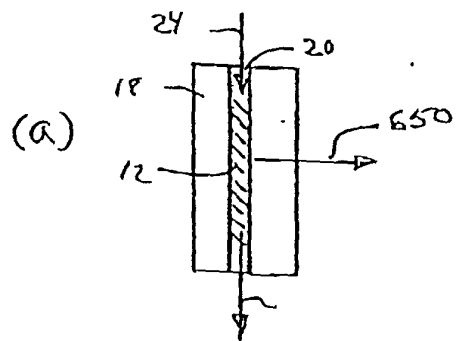


FIG. 40

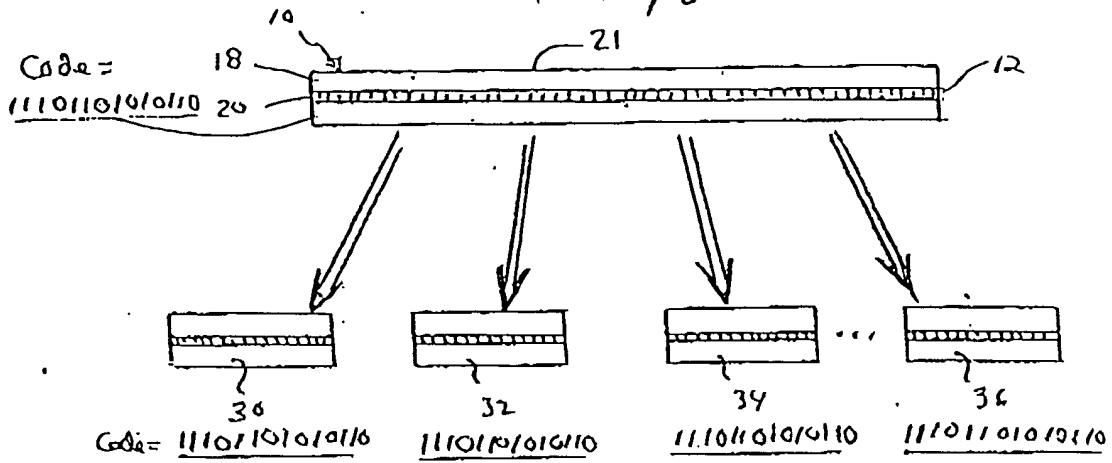


FIG 42

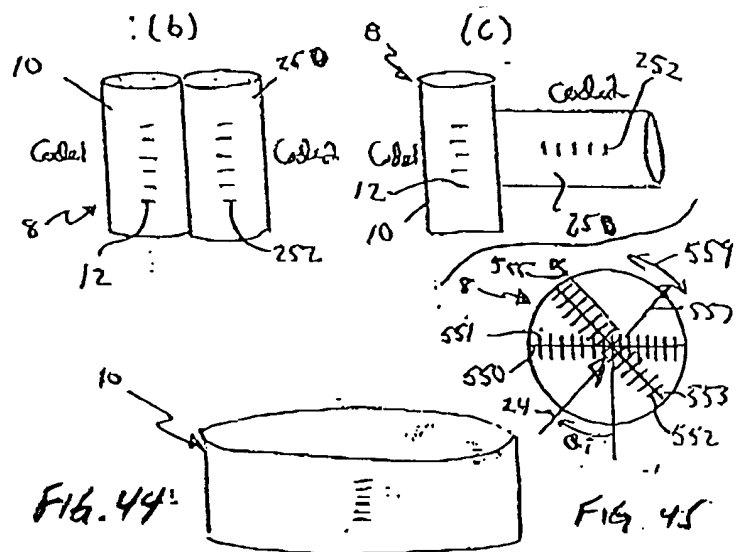
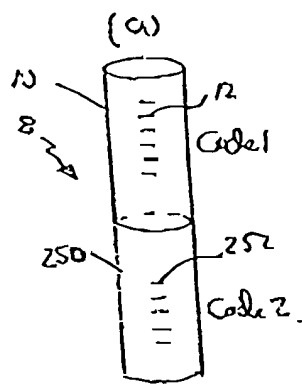


FIG. 44

FIG. 45

FIG 43

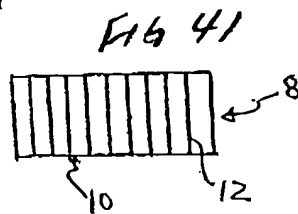
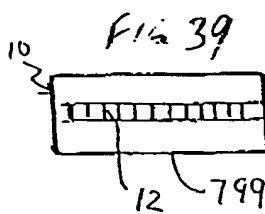
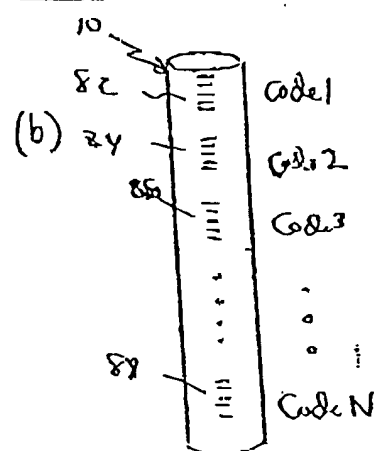
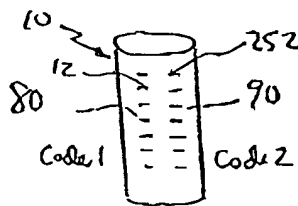


FIG. 46

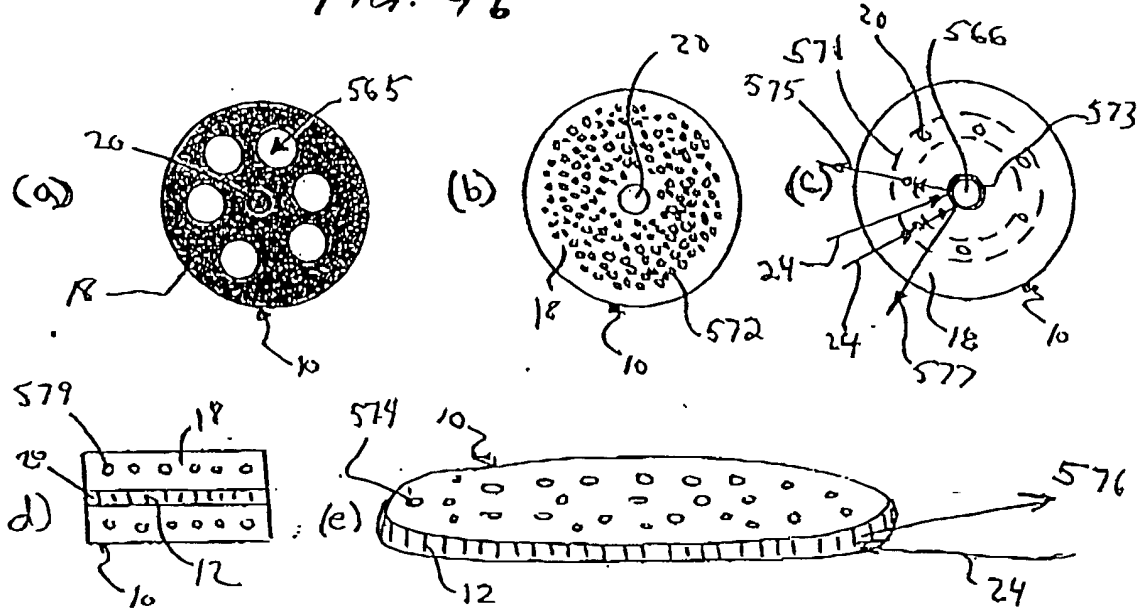


FIG. 47

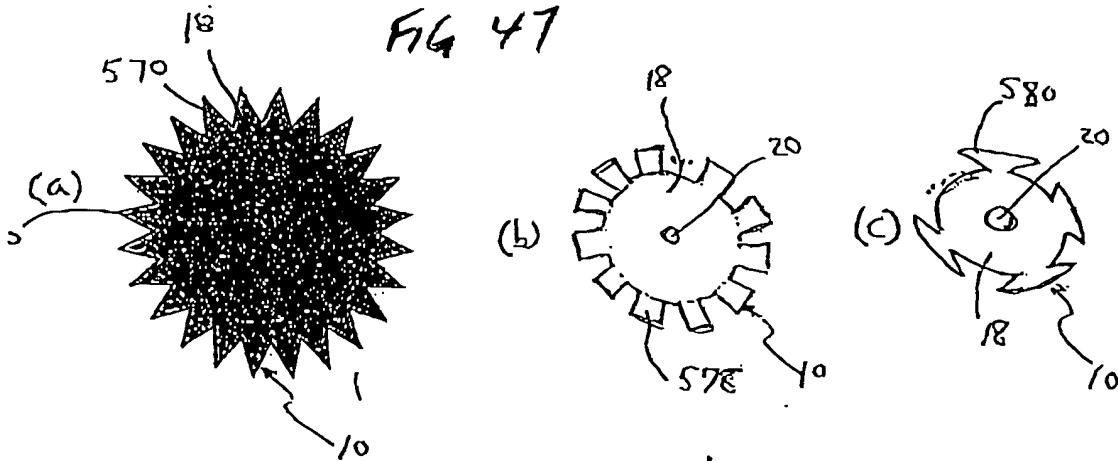


FIG. 48

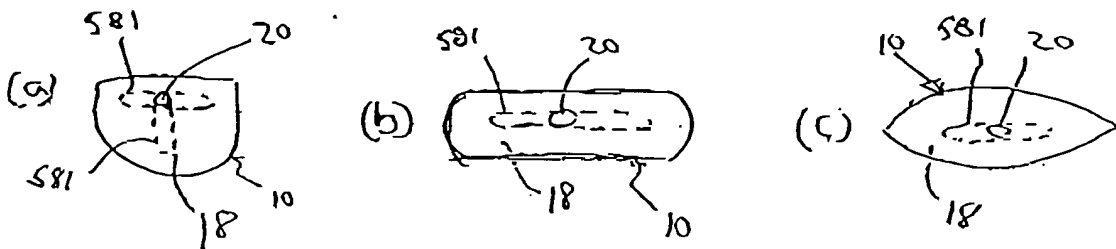


FIG 49

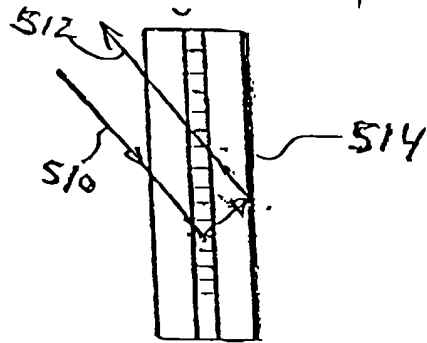
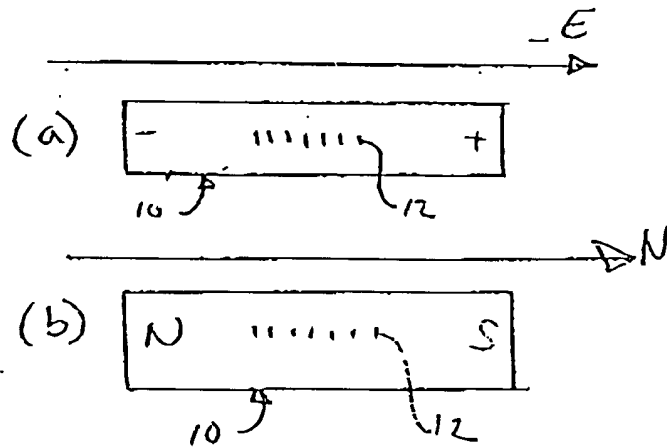


FIG 50



- V-Groove tray built

- Read from:

Flat  
Retro  
Reflector

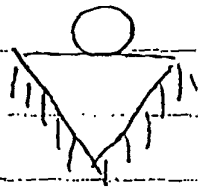


FIG. 51

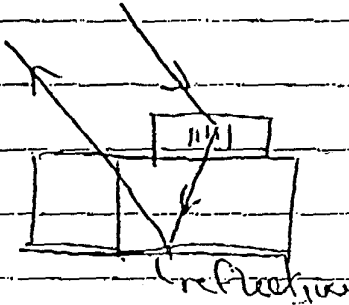


FIG. 52

Read  
thru V-Groove

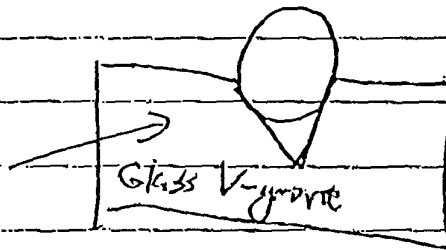


FIG. 53

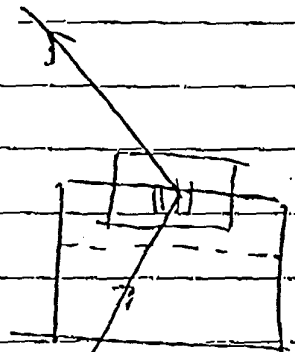


Image  
Through.

V-groove plate

FIG. 54